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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Forest Insect Laboratory
Coeur d'Alene, Idaho
March 14, 1940

MEMORANDUM FOR FILES, FOREST INSECT LABORATORY, COEUR D'ALENE, IDAHO

Re: Screening Lodgepole Pine to Prevent Mountain Pine Beetle Attack (Line Project h-1-1-9)

Studies of the habits of the mountain pine beetle in lodgepole pine revealed that initial attacks on a mature tree usually took place at from three to ten feet above the ground, with subsequent "fill-in" spreading above and below that point. It was believed this habit of attack was due to preference of the insect and that if this preferred area was not accessible to the insects, the tree might not be attacked. To protect this preferred portion of the tree various chemical mixtures and mechanical barriers were tested, but only screening showed promise of effectiveness.

RESULTS OF EXPERIMENTS FROM 1933 TO 1938

It was fully realized when these tests were begun that the timber values of the trees to be protected were insufficient to warrant the cost of the method and its use would be limited to trees of high aesthetic value.

The experiment was begun in 1933, when nine trees near Elkhorn Hot Springs were screened. Attacks were just starting on two of these trees when they were screened and were selected for that reason. It was felt that the element of chance immunity was lowered if the trees selected were already being attacked by the beetles. After screening

no further attacks occurred on these trees. Because of the apparent protection afforded these nine trees, an additional 25 were screened at the Elkhorn Springs resort on the Beaverhead National Forest in 1934. However, the decrease in the mountain pine beetle infestation on the Beaverhead Forest prevented a conclusive test in that region and 27 more trees were screened in 1935 on the Targhee Forest, where an aggressive infestation of the mountain pine beetle in lodgepole pine had been causing comparatively heavy losses for a number of years.

In the meantime some slight losses had occurred on the Beaverhead. Shrinking of the screen and swaying of the tree had apparently caused the screen to be pulled away from the base of one tree, exposing it to a light mountain pine beetle attack and "fill-in" by secondary bark beetles both above and under the screen. A second tree died from some other cause than bark beetles and a third in 1937 from attacks of secondary bark beetles. This third tree had been weakened by road fill piled against it and the tiny secondary insects had either taken advantage of a few small openings in the screen around a cat-faced area, or had been able to enter through the comparatively coarse (14 to the inch mesh) screen. An unusual feature was the finding of larvae of the larger wood borers under part of the screen where it had been drawn tightly against the bark. There being insufficient room under the screen for movement of any but the tiny secondary bark beetles, I can only conclude that the parent beetles oviposited <u>through the screen</u>. Other screened trees in the Elkhorn area had been attacked above or below the screen by from one to five beetles, all

of which had been "pitched-out". In 1938 one missing screened tree at the Elkhorn resort is reported to have been windthrown and salvaged for fuel. In 1939 four trees were robbed of their screen, one of them even being felled to facilitate removal. However, as mountain pine beetle activity is negligible on this part of the Beaverhead, the loss of these trees is not a serious one to the experiment.

In 1935, shortly after the 27 trees had been screened on the Targhee Forest, the possible protection afforded them was indicated by the attack of nine unscreened trees within the screened group and twenty more near by. In 1936 one more tree was heavily attacked and three "fill-ins" of trees lightly attacked in 1935 occurred close to the screened trees. Several screened trees received from one to five attacks above the screen during these two years, but as such attacks occur on unscreened trees, without subsequent "fill-in", no conclusion that definite protection was given by screening could be drawn. However, in 1937 a definite evidence of protection was obtained when 25 attacks above the screen on one tree were "pitched-out". It is believed that this tree would have been heavily attacked and killed had it not been for the screen. Within fifty feet of this tree were five other heavily attacked unscreened trees. None of the other 26 screened trees were invaded by bark beetles in 1937. No bark beetle activity was noted in or near the screened trees in 1938, but in 1939 three were lightly attacked within seventy-five feet of those screened.

Because of a decrease in infestation on the Targhee and the desire to still further assure ourselves of the effectiveness of the method, 26 trees were screened at the Grand Teton Park headquarters in 1938. These trees adjoined the Windy Point area, where an active

infestation of the mountain pine beetle was present. No attacks were noted on these screened trees in either 1938 or 1939, but two trees within one hundred feet "pitched-out" light attacks and four others more heavily hit were noted from two hundred to four hundred feet distant.

DISCUSSION OF THE METHOD

The writer does not feel that this method has been given as severe a test as is necessary to warrant an unqualified recommendation. However, none of the trees on which the screen has remained intact have been overcome by mountain pine beetle attack. Eight screened trees have had from one to five attacks and one had 25, all above or below the screen. Of the unscreened trees among or not over four hundred feet from those screened, 47 have been attacked, of which 35 have been killed. Furthermore, the number screened, 87, seems too high for all of them to have been immune to attack. Therefore we have ample justification for believing that at least some measure of protection from mountain pine beetle attack is afforded trees by screening the basal portion.

It is planned to make annual examinations of the screened trees wherever conditions justify it. If an infestation is found which presents proper conditions, it is hoped that additional trees can be screened in order to give the method further tests.

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